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Victoria 3124 (AU). SCHEBELLA, Callan, Douglas [AU/AU]; 539 Camberwell Road, CAMBERWELL, Victoria 3124 (AU). SOH, Kam-Hung [AU/AU]; 25 Hargreaves Street, HUNTINGDALE, Victoria 3166 (AU).

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(74) Agents: WEBBER, David, Brian et al.; Davies Collison Cave, 1 Little Collins Street, MELBOURNE, Victoria 3000 (AU).

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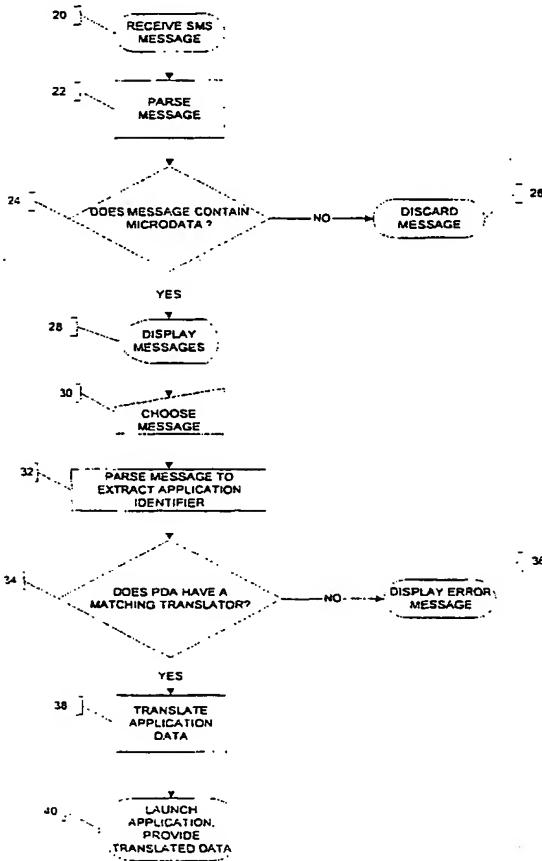
[Continued on next page]

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STRA NEW WAVE PTY LTD [AU/AU]; 242 Exhibition
Street, MELBOURNE, Victoria 3000 (AU).

(72) Inventors; and

(75) Inventors/Applicants (for US only): LAW, Eng, Boon
[MY/AU]; 4/590 Riversdale Road, CAMBERWELL,

(54) Title: MESSAGE PROCESSING



(57) **Abstract:** A message processing method, executed by a personal digital assistant (PDA), including parsing a message to determine whether the message includes application data, parsing the message containing the application data to determine an application type, translating application data into translated data suitable for an application of the application type and providing the translated data to the application. The message includes a first field indicating the message includes the application data and a second field for the application type. The message has a micro-data service (MDS) format and includes the first field identifying the message as an MDS message and a third field including the application data.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

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— *with international search report*

MESSAGE PROCESSING

The present invention relates to message processing, and in particular to a system and method for processing a message containing application data on a computing device, such as a PDA, and for launching an appropriate application and providing the data to it.

Mobile computing devices are becoming essential tools for many people. In particular, personal data assistants (PDAs) such as those manufactured by Palm™, Handspring™, Compaq™, Sony™ and others are used by many business people to organise their daily activities. These PDAs typically come equipped with a number of standard applications, such as a calendar, a text processor, an address book, and a to-do list. However, thousands of third party applications have been developed for PDAs, providing an extremely wide range of features and capabilities. Connectivity is an important requirement for PDAs. In particular, for the traveller, it is important to be able to transfer information to and from the PDA whilst away from the office. For this reason, many PDAs provide the ability to connect to a mobile telecommunications network, either directly, as in the case of the Palm™ VII, or indirectly via an infrared link to a similarly equipped mobile telephone. For example, PDAs can send and receive textual data by using the mobile network's short message service (SMS). Currently, SMS messages are used to send text messages to the PDA user without any application-specific content. For example, an SMS message might be sent to alert a traveller of a new appointment. The traveller would read the message, start up a calendar program on his PDA, and manually enter the appointment details. This manual data input is inefficient and inconvenient. It is desired, therefore, to provide a system and method for processing a message containing application data on a computing device, and for launching and providing the data to an appropriate application, or at least provide a useful alternative.

In accordance with the present invention there is provided a message processing method, executed by a personal digital assistant (PDA), including:

30 parsing a message to determine whether the message includes application data;

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parsing the message containing said application data to determine an application type;

translating said application data into translated data suitable for an application of said application type; and

5 providing said translated data to said application.

The present invention also provides a message processing method, executed by a server system, including:

receiving a network address and application data for a personal digital assistant
10 (PDA);
generating a message including an application identifier and said application data;
and
sending said message for transmission as a short message service (SMS) message
using said network address.

15 The present invention also provides a parser for execution on a personal digital assistant (PDA), said parser including:

code for parsing a message containing application data to locate an application identifier;
20 code for identifying an application on the basis of said application identifier;
code for translating said application data into translated data suitable for said application; and
code for providing said translated data to said application.

25 The present invention also provides a micro-data service (MDS) message comprising a short text message with respective fields for identifying said message as an MDS message, identifying at least one application of a PDA and data for said at least one PDA application.

30 Preferred embodiments of the present invention are hereinafter described, by way of example only, with reference to the accompanying drawings, wherein:

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Figure 1 is a block diagram of a preferred embodiment of an application data messaging system; and

Figure 2 is a flow diagram of a preferred method for processing application data messages on a PDA in the application data messaging system.

5

An application data messaging system 1, as shown in Figure 1, includes a computer 2, a mail server 9, a micro-data service (MDS) server 4, and a gateway 7 to a telecommunications network 8, connected by the Internet 6. The system 1 also includes a mobile telephone 10 and a PDA 12. The computer 2 is a standard computer device or 10 system, such as a PC, that is able to establish a connection to a network such as the Internet 6, and is able to execute a standard browser application, such as Microsoft Internet Explorer. The mail server 9 is a standard computer server system that runs an email server platform, such as Microsoft Exchange, and also maintains a connection with the Internet. The MDS server 4 is a standard computer server system with web server software, such as 15 Microsoft IIS, that is able to execute program scripts and serve HTML pages over the Internet 6. The gateway 7 is a standard SMS or GSM packet radio service (GPRS) gateway that is able to transmit (and receive) SMS messages to the mobile telecommunications network 8. The messages may be those received from the MDS server 4. The mobile telephone 10 is a standard mobile telephone, such as those produced 20 by Ericsson and Nokia for the GSM network, and which includes the ability to connect to a PDA by a communications link, such as an infrared link. The PDA 12 is a standard personal digital assistant running the PalmOS or Microsoft Pocket PC OS.

The MDS server 4 includes HTML pages and forms, for serving to a user with a computer 25 2, and program code for executing the messaging process steps described below, and in particular which enable the MDS server to generate a message in an MDS format and forward this as an SMS message from the gateway 7. The PDA 12 includes an MDS Centre application that is able to process the MDS messages received, as described below. Whilst the steps of the messaging process are most efficiently executed under the control 30 of the program code included in the MDS server 4 and the PDA 12, the steps may also be executed, at least in part, by dedicated hardware circuits included in the server 4 and the PDA 12.

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The messaging system 1 allows messages to be sent from any computer 2 connected to the Internet 6 to the PDA 12 via the mobile telephone 10. For example, if a salesman is travelling with his mobile telephone 10 and PDA 12, the salesman's secretary can send him the details of a new meeting that has just been scheduled. The secretary connects to the

5 MDS server 4 via the Internet 6 using a web browser application on the computer 2. The MDS server 4 sends an HTML form to the web browser to allow the secretary to fill in the appointment details and thereby to create a meeting invitation. The form contains the following (note that HTML presentation code such as <table> has been omitted for clarity):

10 <form method="get"
 action="http://www.mds.telstra.com.au/mds.php3">
 Mobile number:
 <input type="text" name="phone_number">

15 Sender:
 <input type="text" name="sender">

 Date:
 <select name="year">
 <option value="2000">2000</option>
20 <option value="2001">2001</option>
 <option value="2002">2002</option>
 </select>
 <select name="month">
 <option value="01">January</option>
25 <!-- February to November omitted for clarity -->
 <option value="12">December</option>
 </select>
 <select name="day">
 <option value="01">1</option>
30 <!-- 2 to 30 omitted for clarity -->
 <option value="31">31</option>
 </select>

 Time
35 Start:
 <select name="start_time">
 <option value="0000">12am</option>
 <!-- 1am to 10pm omitted for clarity -->
 <option value="2300">11pm</option>
40 </select>
 End:
 <select name="end_time">
 <option value="0000">12am</option>

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```
<!-- 1am to 10pm omitted for clarity -->
<option value="2300">11pm</option>
</select>
<br>
5 Reminder:
<input size="3" type="text" name="reminder_time">
<input type="radio" name="reminder_unit" value="M"
checked>Minute</input>
<input type="radio" name="reminder_unit"
10 value="H">Hour</input>
<input type="radio" name="reminder_unit"
value="D">Day</input>
<br>
Message:
15 <textarea name="message" cols="40"
rows="2"></textarea><br>
<input type="submit" name="butSend" Value="Send">
</form>
```

20 The secretary completes this form with the following data:

```
Mobile number = 0407040254
Sender = sender@home.com
Date = 2000, September 7
Start = 10am
25 End = 11am
Reminder = 10
reminder_unit = M
Message = Mr Elmo Raine: Fish Project Meeting
```

30 When the secretary then presses the "Send" button on the form, the web browser sends the following data to the MDS Web server:

```
phone_number=0407040254&sender=sender%40home.com&year=2000&m
onth=10&day=03&start_time=1100&end_time=1300&reminder_time=1
0&reminder_unit=M&message=Mr%20Elmo%20Raine%3A%20Fish%20Proj
ect%20Meeting&butSend=Send
```

In an alternative embodiment, a copy of the appointment is sent from the MS Exchange Server 9 to the MDS server 4 which subsequently converts the appointment into the an MDS format, as described below.

40

Whether the MDS message is created on the computer 2 or the MS Exchange server 9, it is sent to the MDS server 4 for conversion into the MDS format. The MDS Server 4 then

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sends the MDS message via the gateway 7 to a telecommunications network 8, from which it is transmitted as an SMS message to the salesman's mobile telephone 10. The message is sent to the gateway 7 as a text string or a suitable format recognised by the gateway, which can be constructed into an SMS message.

5

The MDS data format may be described in a notation system based on Backus-Naur Form. In this notation system:

- (a) text within angled brackets (<>) denotes a symbol;
- (b) symbols on the left of a definition symbol (::=) are defined by symbols on the right of a definition symbol;
- (c) text within double quotes ("") is a string constant;
- (d) parentheses (()) are used to group symbols;
- (e) square brackets ([]) represent possible characters for a symbol, e.g [A-Z] means "any character from A to Z";
- (f) a vertical bar (|) is the inclusive-OR operator;
- (g) a superscript number, n, with a minus symbol (-) means "at most n repetitions";
- (h) a superscript number, n, with a plus symbol (+) means "at least n repetitions";
- (i) a superscript number, n, means "exactly n repetitions";

20 The MDS message format is defined in this notation as:

<MDS Message> ::= <Fixed Tag> <Separator> <Application Identifier> <Separator> <Payload>

25 <Fixed Tag> ::= "MDS"

<Separator> ::= ":"

30 <Application Identifier> ::= [A-Za-z]⁴

An example of an MDS message is:

MDS:DATE:<Payload>.

35 The format of <Payload> depends on the specific application. For example, an input message for the particular calendar application with the identifier "DATE" is:

40 <Payload> ::= <From Address> <Separator> <Date> <Separator> <Start Time> <Separator> <End Time> <Separator> <Reminder Time> <Separator> <Reminder Unit> <Separator> <Note>

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<From Address> ::= <Alphanumeric>^x
<Date> ::= YYYYMMDD
5 <Start Time> ::= HHMM
<End Time> ::= HHMM
10 <Reminder Time> ::= [0-9]²
<Reminder Unit> ::= {M | H | D} (M = minute, H = hour, D = day)
15 <Note> ::= <Alphanumeric>^y
<Alphanumeric> ::= [A-Za-z0-9@._]

The size of x and y is constrained by the size of the underlying message transport system.
20 The salesman's new meeting appointment is with a Mr Elmo Raine on 7 September 2000, from 10 am to 11 am, with a reminder 5 minutes before the meeting, and a brief note, "Fish project meeting". The payload or calendar program MDS data representing the salesman's new appointment is therefore:
25 Mr Elmo Raine:20000907:1000:1100:5:M:Fish project meeting

The entire MDS message containing this data is then:
30 MDS:DATE:Mr Elmo Raine:20000907:1000:1100:5:M:Fish project meeting
This MDS message is received from the telecommunications network 8 as an SMS message on the salesman's mobile telephone 10. The salesman is able to recognise the message as an MDS message by the leading "MDS:" characters. The mobile telephone 10 and the PDA 12 are both equipped with infrared (IR) ports, allowing them to communicate
35 with each other. The link may also be provided by other short-range links such as a serial cable or a radio-frequency protocol such as Bluetooth. The salesman runs the MDS Centre software application on the PDA 12, and instructs the application to enter a mode for receiving messages via the IR port on the PDA 12. He points the IR ports of the two

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devices at each other and instructs the PDA software to retrieve SMS messages from the mobile telephone 10.

The MDS Centre application receives the SMS messages and begins processing them
5 according to the flowchart shown in Figure 2. After receiving the SMS messages in step
20, the messages are parsed (step 22) to determine whether they contain MDS data or are
just ordinary text messages (step 24). For example, messages beginning with the four
characters "MDS:" are deemed to be MDS messages. Messages that do not contain MDS
data are discarded (step 26). MDS messages are stored, but the leading four characters are
10 removed to reduced memory consumption and improve readability on the PDA screen.
After all of the new SMS messages have been processed, the MDS Centre application exits
the mode for receiving messages (steps 20-26) and enters a message browsing mode.

The list of unprocessed MDS messages are now displayed (step 28), and the MDS Centre
15 application waits for a message to be selected for further processing. The salesman chooses
the new appointment message for further processing (step 30). The message is now parsed
(step 32) and the application identifier "DATE" is extracted from the MDS data. The
application searches a configuration file of the application for an entry matching the
application identifier (step 34). If an entry is not found, an error message is displayed (step
20 36). Otherwise, the matching entry is processed by a translator module of the MDS Centre
application in order to determine how to translate the MDS data string into the appropriate
format for the matching application. For the example, the configuration file contains the
following translation entry:

25 [DATE]
APPLICATION="Calendar"
APPDATA="
BEGIN: VCALENDAR\015\012
BEGIN: VEVENT\015\012
30 DTSTART: {\$2}T{\$3}00Z\015\012
DTEND: {\$2}T{\$4}00\015\012
DESCRIPTION: {\$7}\015\012
END: VEVENT\015\012
END: VCALENDAR\015\012
35 "

and the MDS data contains the following:

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Mr Elmo Raine:20000907:1000:1100:5:M:Fish project meeting

The numbered arguments of the translation entry denote the corresponding fields of the
5 MDS data. For example, the seventh field, "Fish project meeting" is represented by "{\$7}"
in the translation entry. Hence the MDS data is translated (step 38) in accordance with the
translation entry to produce:

10 BEGIN: VCALENDAR\015\012
10 BEGIN: VEVENT\015\012
10 DTSTART: 20000907T100000Z\015\012
10 DTEND: 20000907T110000Z\015\012
10 DESCRIPTION: Fish project meeting\015\012
10 END: VEVENT\015\012
15 END: VCALENDAR\015\012

Only some of the possible fields were used in this example. Carriage returns and line feeds
in the translation entry are ignored, and if these or other special characters are desired in
the translated output, they are represented by their octal ASCII codes using C notation, as
20 in the example above.

Now that the MDS data has been translated into an appropriate form that the application
can understand, the Calendar application is launched by the MDS Centre application and
the translated data is sent to the application (step 40). For example, in Palm™ PDAs, the
25 PalmOS™ Exchange Manager is used by the MDS Centre application to launch the
Calendar application, and pass it the translated data on startup. The MDS message is then
removed from the list of unprocessed messages displayed by the MDS Centre application.
The Calendar application processes the translated message and enters the new meeting data
into the calendar on the PDA 12 for the salesman.

30 For implementation with the PalmOS™, two additional records may need to be defined in
the parser of the application: the first is the identifier for the target application (e.g.
Calendar has an identifier called "sysFileCDatebook") and the second is a string
containing the file name extension used by the target application (e.g. a Calendar

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application expects a file name extension of ".vcs"). Additional records of this nature may or may not be required depending on the PDA's operating system.

To support the extensibility of the MDS application (for supporting new PDA applications), new translator modules can be delivered to and stored on the PDA in the same way as delivering and storing any new applications on the PDA. For example, on a PDA running PalmOS™, the translation module would be delivered in the same manner as a Palm application and stored as a Palm™ DataBase.

5 10 The flexible MDS message format defined above supports new applications from any source. All that is required is to reserve a new application identifier for a new application. However, a single application may support many application identifiers.

In an alternative embodiment, individual PDA applications are able to examine the list of unprocessed MDS messages, translate selected messages which contain the application identifier of the running application, and process the resulting data. In a further embodiment, the task of receiving the SMS messages from the network 8 may also be performed directly by the application, as the PDA 12 could receive SMS messages directly from the telecommunications network 8, avoiding the need for the mobile telephone 10.

20 25 The system 1 may be used in a range of applications, including the transmission of security tokens (such as authentication codes) for mobile commerce and application service providers, and the transmission of 'fill-in' forms to obtain machine-readable responses from mobile users.

25 Many modifications will be apparent to those skilled in the art without departing from the scope of the present invention as herein described with reference to the accompanying drawings.

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CLAIMS:

1. A message processing method, executed by a personal digital assistant (PDA), including:
 - 5 parsing a message to determine whether the message includes application data; parsing the message containing said application data to determine an application type; translating said application data into translated data suitable for an application of said application type; and
 - 10 providing said translated data to said application.
2. A message processing method as claimed in claim 1, wherein said message includes a first field indicating the message includes said application data and a second field for said application type.
- 15 3. A message processing method as claimed in claim 2, wherein said message has a micro-data service (MDS) format and includes said first field identifying said message as an MDS message and a third field including said application data.
- 20 4. A message processing method as claimed in claim 2, wherein said translating is executed on the basis of translation data stored in said PDA.
- 25 5. A message processing method as claimed in claim 4, wherein said translating is extensible to support an additional application by storing additional translation data.
6. A message processing method as claimed in claim 5, including storing at least one additional translator module to execute said translating for a respective at least one additional application.
- 30 7. A message processing method as claimed in claim 5, including launching said application to provide said translated data to said application.

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8. A message processing method as claimed in claim 1, wherein said message is a short message service (SMS) message from a telecommunications network.

5 9. A message processing method as claimed in claim 8, wherein said message is received from a mobile telephone that receives the message.

10. A software application stored on a PDA, said application having code for executing a message processing method as claimed in any one of the preceding claims.

10

11. A PDA having components for executing a message processing method as claimed in any one of claims 1 to 9.

12. A message processing method, executed by a server system, including:
15 receiving a network address and application data for a personal digital assistant (PDA);
generating a message including an application identifier and said application data;
and
sending said message for transmission as a short message service (SMS) message
20 using said network address.

13. A message processing method as claimed in claim 12, wherein said message includes a first field indicating the message includes said application data and a second field for said application type.

25

14. A message processing method as claimed in claim 13, wherein said message has a micro-data service (MDS) format and includes said first field identifying said message as an MDS message and a third field including said application data.

30 15. A server system having components for executing a message processing method as claimed in claim 12, 13 or 14.

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16. A parser for execution on a personal digital assistant (PDA), said parser including:
 - code for parsing a message containing application data to locate an application identifier;
 - 5 code for identifying an application on the basis of said application identifier;
 - code for translating said application data into translated data suitable for said application; and
 - code for providing said translated data to said application.
- 10 17. A parser as claimed in claim 16, wherein said translating code is extensible to support at least one additional PDA application.
18. A micro-data service (MDS) message comprising a short text message with respective fields for identifying said message as an MDS message, identifying at least one application of a PDA and data for said at least one PDA application.

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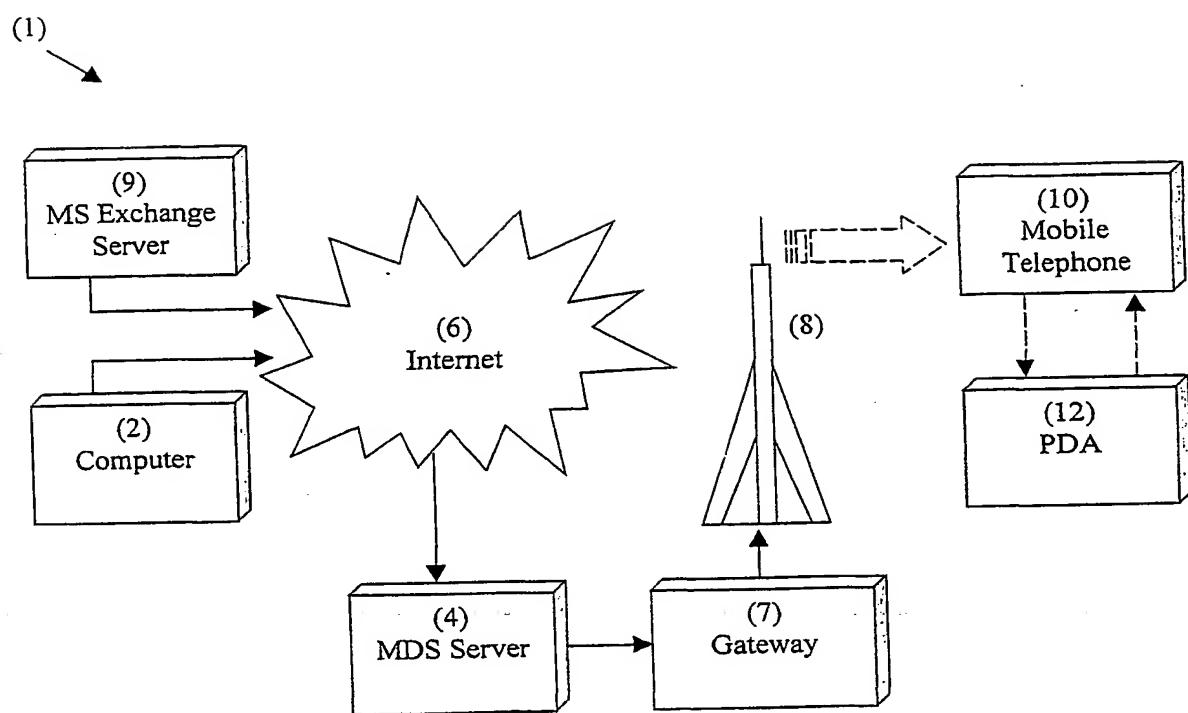


Figure 1

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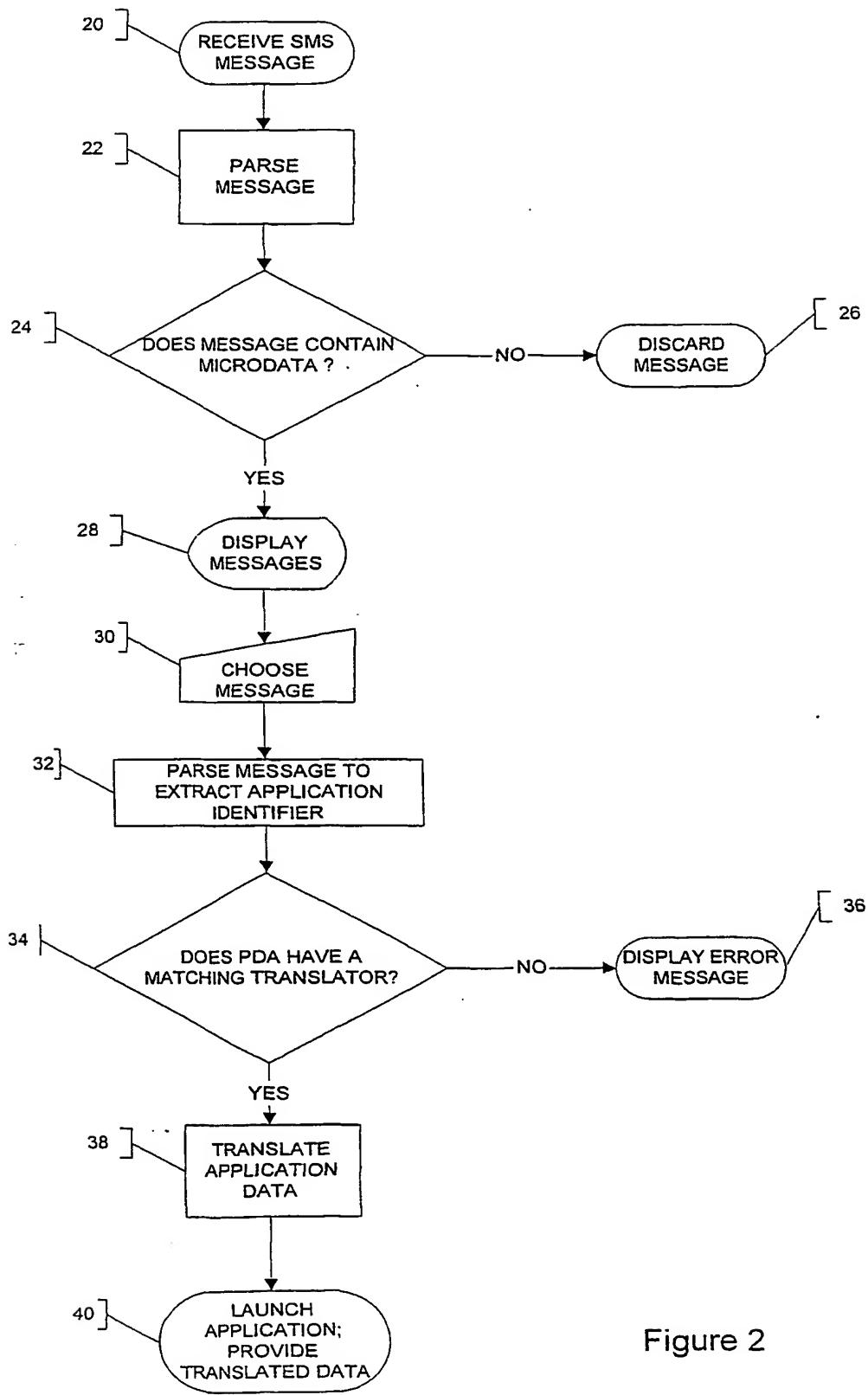


Figure 2

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU01/01201

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. 7: H04Q 7/32

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
WPAT, Internet: message, application, data, parse, separate, identify, analyse, PDA, personal digital.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6078820 A (WELLS et al) 20 June 2000 Abstract, column 13 line 41 - column 15 line 12, figure 4	1-18
X	US 6125281 A (WELLS et al) 26 September 2000 Abstract, columns 9 and 10, column 13 line 33 - column 14 line 30, figure 4	1-18
P, A	GB 2349044 A (EMISIS INFOCOM GROUP PLC) 18 October 2000 Whole document	1-18

Further documents are listed in the continuation of Box C See patent family annex

* Special categories of cited documents:		
"A" document defining the general state of the art which is not considered to be of particular relevance	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent but published on or after the international filing date	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means		document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	"&"	

Date of the actual completion of the international search
30 November 2001

Date of mailing of the international search report

7 DEC 2001

Name and mailing address of the ISA/AU

Authorized officer

AUSTRALIAN PATENT OFFICE
PO BOX 200, WODEN ACT 2606, AUSTRALIA
E-mail address: pct@ipaustralia.gov.au
Facsimile No. (02) 6285 3929

DEREK BARNES

Telephone No : (02) 6283 2198

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU01/01201

Box I Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos :
because they relate to subject matter not required to be searched by this Authority, namely:
2. Claims Nos :
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. Claims Nos :
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

Box II Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

(see extra sheet)

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims
2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU01/01201

Supplemental Box

(To be used when the space in any of Boxes I to VIII is not sufficient)

Continuation of Box No: II

The different inventions are:

1. Claims 1-11 and 16-17 directed to a message processing method including parsing a message containing application data to determine an application type, translating the application data into translated data suitable for an application of the application type, and providing the translated data to the application.
2. Claims 12-15 directed to a message processing method including receiving a network address, generating a message including an application identifier and application data and sending the message for transmission as a short message service message using the network address.
3. Claim 18 directed to a micro-data service message comprising a short text message with respective fields for identifying the message as an MDS message and identifying an application and data for one application of a PDA.

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/AU01/01201

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report				Patent Family Member			
US	6078820	AU	62149/98	EP	956719	US	6125281
		WO	98/34422				
US	6125281	AU	62149/98	EP	956719	US	6078820
		WO	98/34422				
GB	2349044	AU	40199/99	AU	2000/45804	EP	1049006
		GB	9908782	WO	2000/63774		

END OF ANNEX

